

Prescriptive
engineering
services



IMI
Insyte



**Stop the cracks
before they start**

Existing equipment- prescriptive solutions

The continuous cycling of spraywater systems in combined cycle power plants frequently leads to system-critical cracking.

The increased cycling puts stress on plant equipment. Cracks in pipes and valves are a familiar sight for those inspecting the equipment. When spraying cold water onto hot metal as part of the attemperation process, the development of cracks become inevitable.

The result is unexpected shutdowns, lost revenue, and unsafe working conditions.

Having to stop the plant to replace cracked or otherwise damaged equipment is not a simple

task. It commonly requires cranes, or other heavy equipment, scaffolding, and significant downtime.

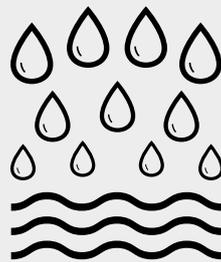
engineering and physics-based spray solutions, IMI InsyT's cloud-based platform takes your operating data and uses it to investigate potential failures in your systems – protecting your plant and people.



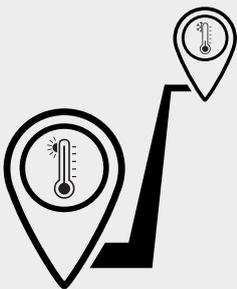
Common plant issues that cause cracking



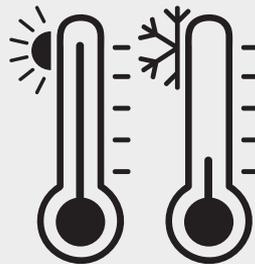
Most plants were built to run at baseload with few starts and stops. Renewable energy supplies require plants to start and stop every day.



Condensate accumulation can generate catastrophic failures in boiler piping and can impact the turbine.



If attemperators and desuperheaters are located too close to elbows, hot and cold streams can separate and cause large temperature gradients. This affects desuperheater performance and usage cycles.



Original plant control logic left over from commissioning can lead to significant problems with temperature control. This causes major thermal gradients and stresses.



Insy: the proactive approach to plant maintenance

With Insyt, you can:

- > Identify data signatures that lead to structural integrity issues such as cracks and leaks
- > Fix plant control logic issues that create massive thermal stresses
- > Identify equipment concerns that impede system performance

Insy is a digital, end-to-end prescriptive engineering service that identifies problems in your system, helping you stop failures before they happen.

Using data-driven analytics, it identifies misoperation, poor design, and inadequate maintenance, improving plant safety and performance.

The system-wide approach ensures peace of mind for you, increased

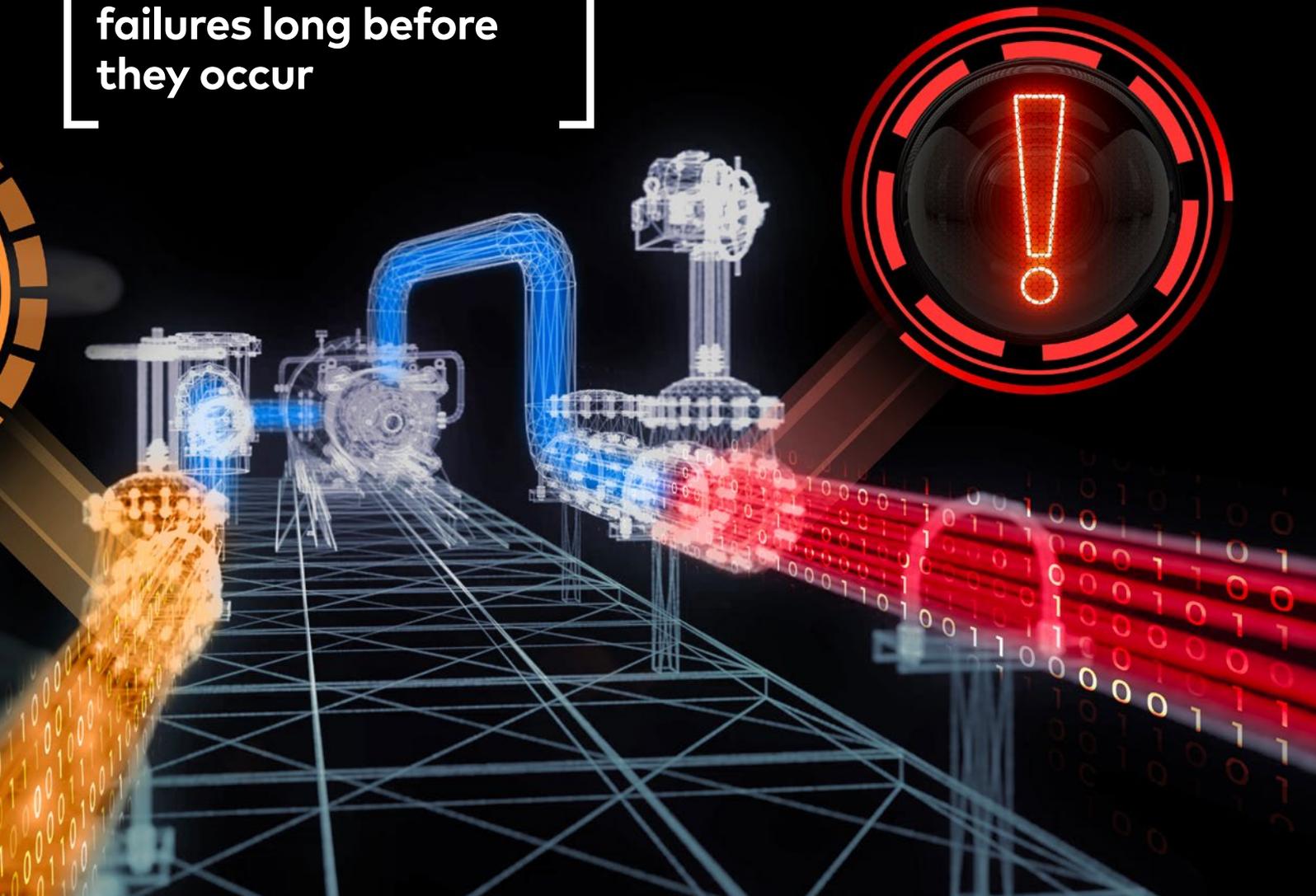
safety for personnel, and big savings for your plant, with no unplanned shutdowns.

This system-wide, physics-based analysis, carried out by highly experienced IMI engineering experts, identifies improvements needed for desuperheating performance and system control, including thermal gradients, spraywater control, atomization, system synchronization, and more.

The benefits of using Insyt:

- > A proactive approach to failure prevention through improved plant reliability
- > Improved maintenance planning and scheduling
- > Large data batch processing by industry experts
- > Reduce workplace accidents and near misses
- > Save time and money, and improve your ROI

Insy identifies and alerts you to potential failures long before they occur



Insy: How it works

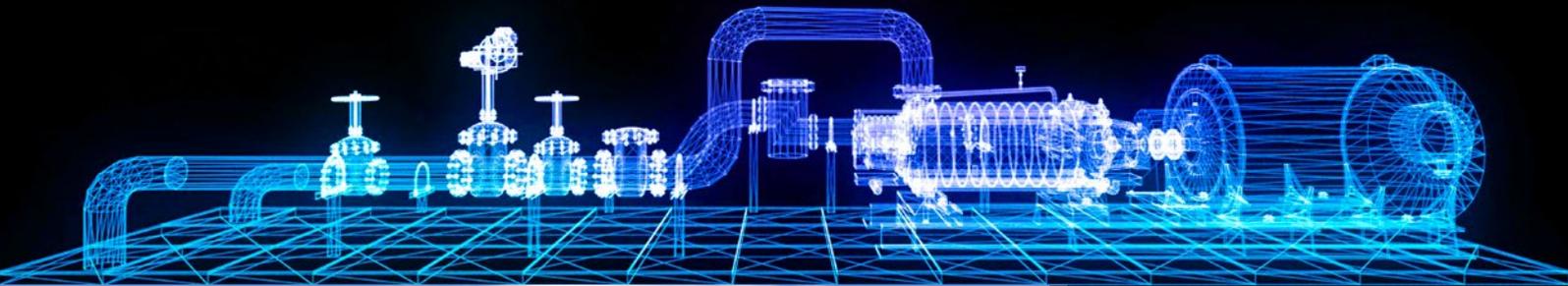
Through Distributed Control System (DCS) data review, the IMI Insyt service analyzes desuperheater and turbine bypass system (TBS) performance to identify operational issues, poor control logic, and faults in hardware design.

Reviewing control system performance verifies stability. The normal measures of plant cycle life

do not reliably indicate the condition of a desuperheating system, so Insyt reviews information about spray pattern, atomization, steam energy, superheat, and more.

Installations can also be reviewed remotely through P&IDs and isometric drawings, citing common problems with installations, and recommending fixes.

An Insyt review can prevent future problems that increase plant stresses, reduce equipment life, and increase the risk of future pipe failures. These events may lead to safety hazards and unplanned outages, potentially costing plants millions in downtime and repairs.



Common problem applications

- > Interstage attemperators
- > Turbine bypass systems
- > Auxiliary steam systems
- > Steam letdown stations
- > Turbine exhaust desuperheaters

Issue Identified.
Recommended
corrective actions
will be provided.



How we acquire data, and what we do with it

The distributed control system (DCS) is the brain of the plant, providing process control automation, and ensuring that the plant operates within the boundaries of performance through instrumentation and alarms.

Plant operators use the DCS to regulate the upper and lower limits on the system, with fail-safes to prevent large-scale failure.

As part of its operation, the DCS receives very large amounts of information from sensors and other instrumentation throughout the plant. This historical data is captured and can be reviewed for troubleshooting purposes.

Interpreting this amount of data can be an arduous task.

Plant operators may lack the time or expertise to use the data effectively and determine the root cause of developing issues.

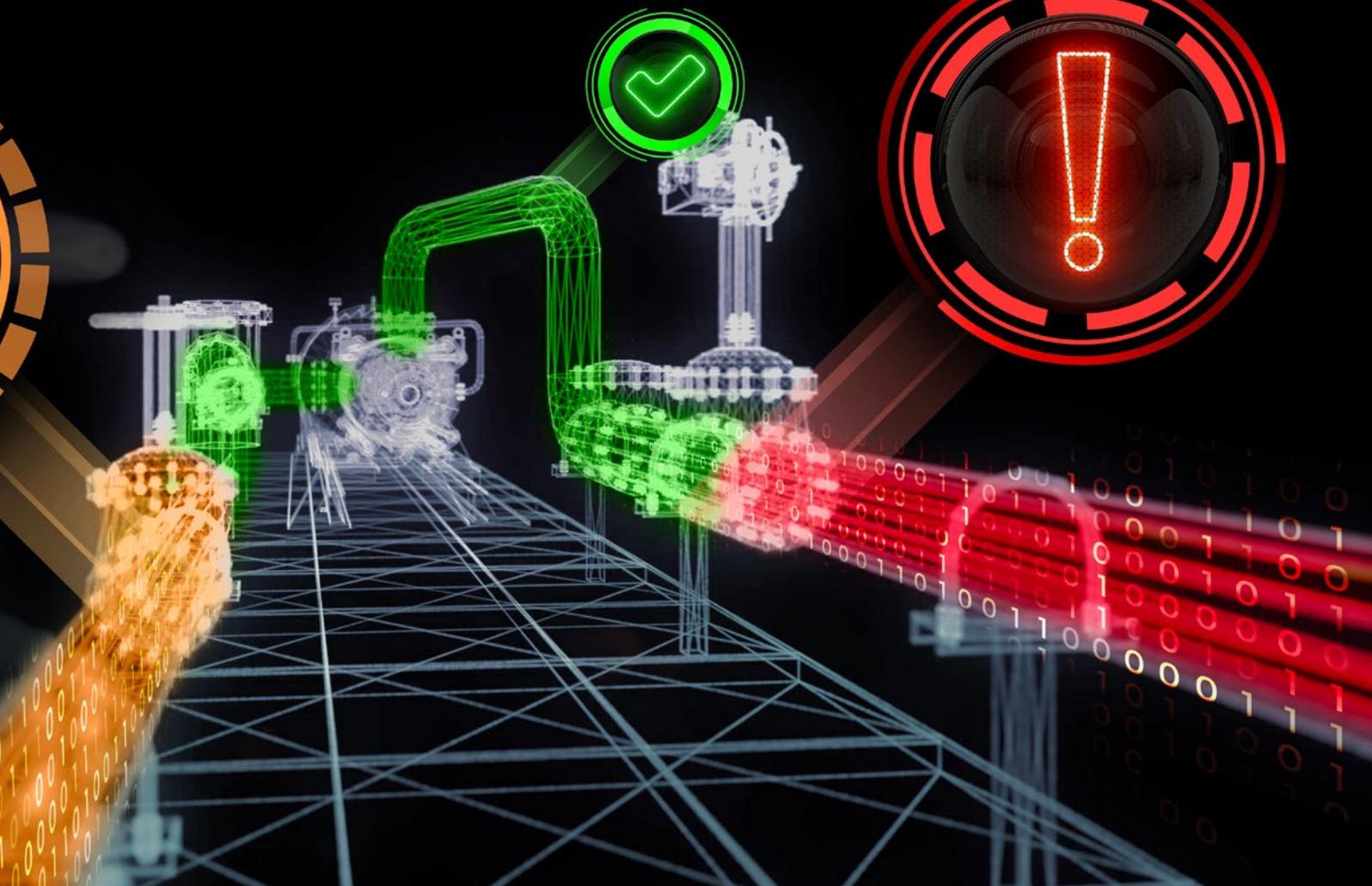
Additionally, this data typically comes from high-level plant sensors that monitor pressures, temperatures, and flows.

Expertise is required to translate these parameters into critical values that can be used to make recommendations for specific hardware optimization and system control.

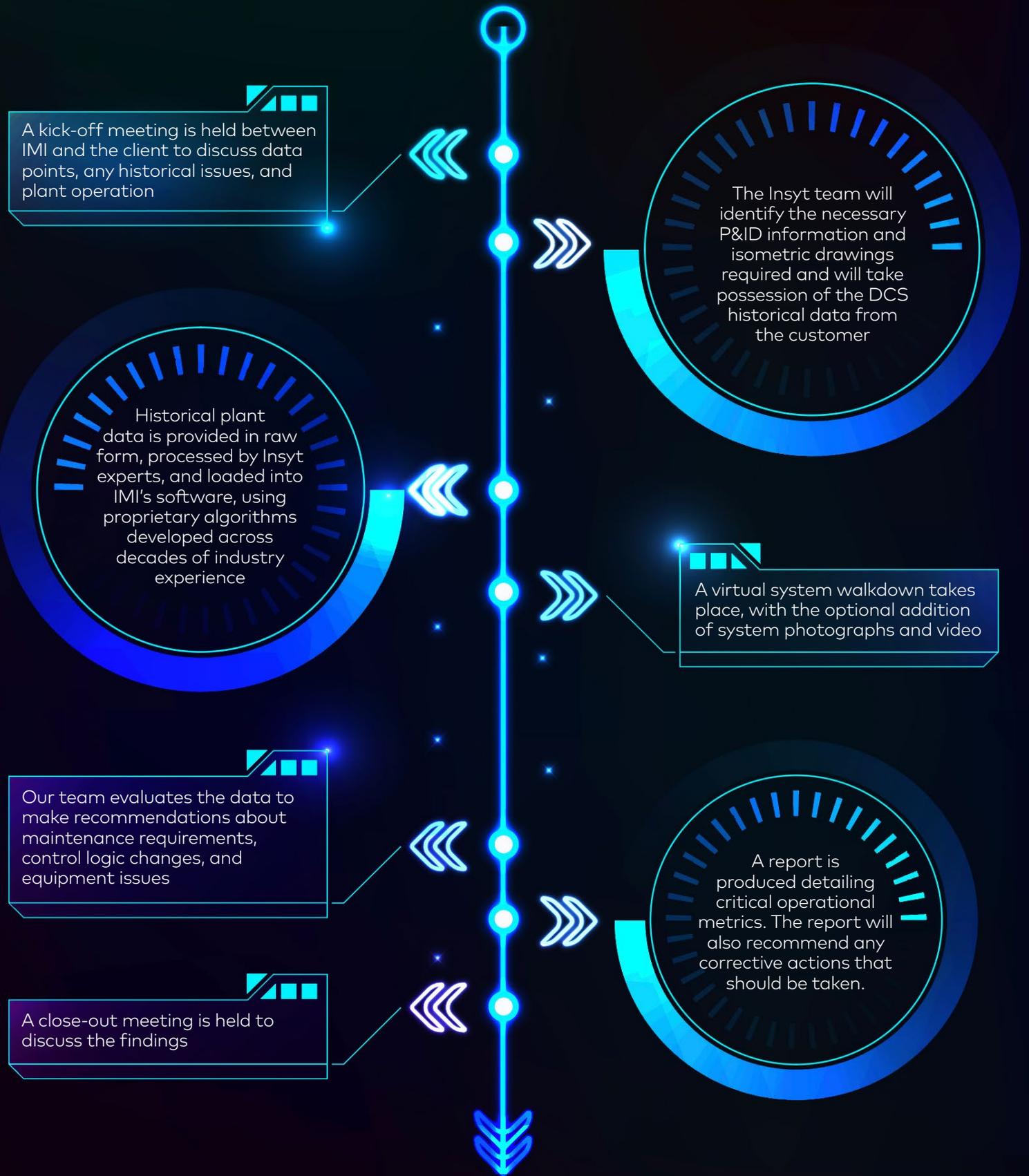


Potential failure imminent.
Immediate action needed to resolve problem.

No issues detected.
System operating properly.



Our journey together



This is the beginning of a continuous partnership, with regular monitoring and evaluation to detect any emerging problems and maintain plant operations at optimum efficiency

Critical operational metrics

The report will detail operational metrics, including but not limited to:

- > Thermal gradients
- > Spray valve cycling
- > Temperature cycling
- > Quenching events
- > Wet steam
- > Valve performance
- > Control system behavior

The report will also recommend any corrective actions that should be taken



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